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Sector examples of climate adaptation

The following section includes five case studies that provide examples of existing climate adaptation activities within the sector. Further examples can be found in Theme 2 under Appendix 2.

Case study 1: Development of a robust communications network to support emergency management in the remote Wujal Wujal community

Wujal Wujal, a remote Indigenous community on Cape York Peninsula, often suffers major challenges during heavy rain, with all roads out of town routinely cut off, and the Bloomfield River flooding and dividing the town. Unreliable telecommunications service during such severe weather events was

a major barrier in community response and emergency management. In previous years, telecommunications have failed on several occasions during extreme events for periods in excess of 48 hours. To increase emergency management capacity, Wujal Wujal Aboriginal Shire Council has set up a new communications

network that is independent of the Telstra landline and mobile 3G system, and can be used for emergency management to provide warnings to communities, even if the landline and mobile networks fail. The project was funded by the former Queensland Department of Infrastructure, Local Government and Planning.



Figure 12: Left image: Back-up battery system. Middle image: Communication access point. Right image: Online community forum.

An Australian first, the Wujal Wujal valley-wide Emergency Management Network and Community Forum provides those working and living within the community with a means of telecommunications that is wind- and rain-resistant and robust, and has sufficient capacity to enable local council, police, health services and volunteers to manage conditions pre- and post-emergency event when and if normal telecommunications systems are compromised. The network operates independently of the energy supplier Ergon, with each equipment site equipped with solar and battery systems (Figure 12, left-hand side). The network

operates parallel to Council’s existing servers and is firewalled and secure.

Key network functionalities are:

- The network provides intra-community communications by voice, text and email using a VoIP application on ‘smart devices’, even if the telecommunications network has failed.
- Council is able to batch issue warnings, notifications and information to network users and groups of users by voice, text and email.

- Internet access is available through the network for select users.
- Video and image transfer is available.
- Council can view and operate infrastructure, including water and wastewater treatment, collection and storage facilities through the network.
- Users are able to access Council-approved websites, including Transport and Main Roads (flood cams), Bureau of Meteorology and Ergon.



The network, which was designed and developed in 16 weeks, is based on a microwave radio-linked backbone with three main towers (Figure 12, middle). It has two communication servers that share the workload, each capable of automatically controlling network operations should the other fail. Cyclone-hardened wi-fi access points take signals

to and from the radio backbone, and deliver services to the user via wi-fi to hand-held smart devices and PCs equipped with a wireless network card. Services on the network can be accessed using publicly available free Android and iOS apps. Most households in the community have at least one smart phone user. This hard communications

network is supported by 'soft services', providing access to this functionality to the community. This includes broadcast voice and text messages to smart phones and an online platform to disseminate relevant information (Figure 12, right-hand side).

Case study 2: Queensland Future Climate Dashboard

Understanding the need to provide reliable regional scale simulations of future climate, the Science Division from DES has downscaled 11 state-of-the-art global climate models to 10 km grid cells. Higher spatial resolution means that regional climate models take into account local biophysical properties such as topography, vegetation and land-sea contrast, and better simulate local climate as a result. In addition, Queensland's future climate simulation provides continuous projections until the end of the century, rather than previously used time windows. However, these improvements to the spatial and temporal resolutions produce larger files and create new barriers for data accessibility.

In order to facilitate data access and support climate adaptation policies and management, DES has conceptualised and implemented a new online platform with information about future climate. The Queensland Future Climate Dashboard summarises information from 11 state-of-the-art climate models with regional scale simulations until 2099. The dashboard is a visualisation platform composed of drop-down menus, maps, plots and

tables, so users can customise, visualise and export summarised future climate information according to their interest.

The Queensland Future Climate Dashboard provides high resolution simulations for 30 different metrics grouped in six climate themes:

1. mean climate
2. heatwaves
3. extreme temperature indices
4. extreme precipitation indices
5. droughts
6. floods.

The information for regional projections was spatially aggregated from 10 km pixel-size grids to specific regions. The five specific regions in which projections are presented are:

1. local government areas
2. Regional Plan areas
3. bioregions
4. major river basins
5. disaster districts.

In addition, users can visualise and download future climate data across calendar seasons, wet and dry periods and years. Information is summarised for four 20-year time slices centred in 2030, 2050, 2070 and 2090.

The Queensland Future Climate Dashboard offers a fully interactive interface where users can customise maps and plots, as well as download summary statistics, screenshots and spatial data for different purposes, such as local and regional planning, biodiversity management, water management and emergency services. By combining cutting-edge high-resolution climate models and latest trends in big data visualisation within an interactive platform, DES expects to bridge climate science and adaptation through an easy-to-use platform for end-users (see figure 13).

Visit the dashboard at <https://longpaddock.qld.gov.au/climate-adaptation/>

High Resolution Climate Change Projections

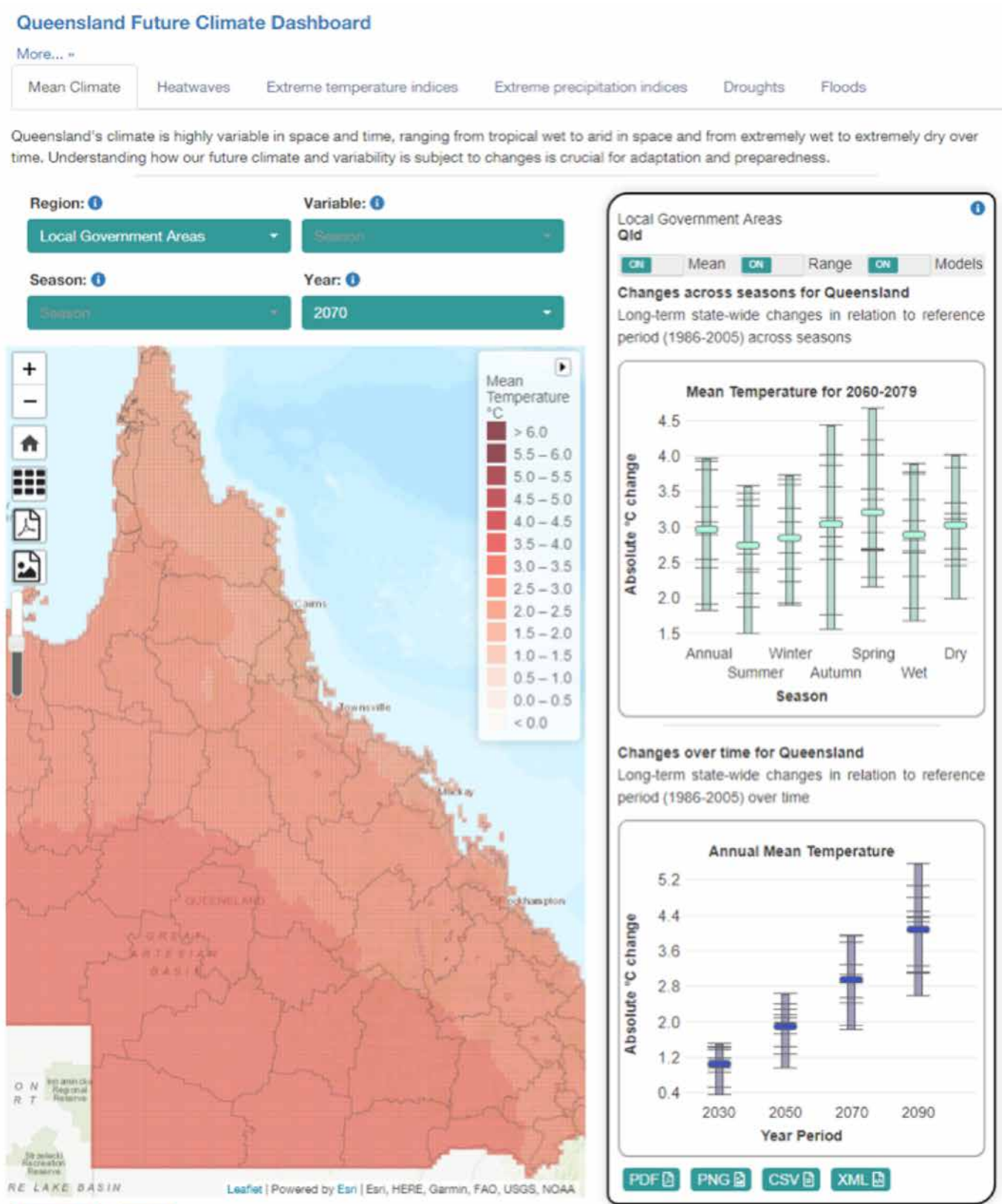


Figure 13: Queensland Future Climate Dashboard, an interactive geovisualisation platform for high resolution climate simulations.



Case study 3: State Heatwave Risk Assessment – Moving towards a collaborative understanding of Queensland’s current and future risk

The State Natural Hazard Risk Assessment 2017 accorded the risks posed by severe and extreme heatwaves as the third highest priority for Queensland. They cause substantial impacts for society and the environment in several ways, including human health, agriculture, economy, natural hazards and ecosystems. Heatwaves are Australia’s most costly natural disaster in terms of human impact, resulting in 4555 deaths from 1900 to 2011; greater than the sum total of all other natural hazard fatalities in the same period [32].

In January 2018, QFES began the process of undertaking a detailed macro-level risk assessment in partnership with

Queensland Health and DES. The key objectives of the assessment include:

- support and inform key decision-making and disaster management planning across all levels of the QDMA with regard to current and future heatwave risk
- support Queensland Health in its role as the lead agency for heatwaves under the State Disaster Management Plan
- use the most current and accurate projections to understand Queensland’s future heatwave risk potential

- analyse and report on severe and extreme heatwave risk against the six exposed elements categories used in the QERMF.

The project will be a collaborative effort across government and non-government organisations across the public and private sectors, and involve substantial engagement at state and regional level. It will culminate in the publication of the State Heatwave Risk Assessment (planned for January 2019).

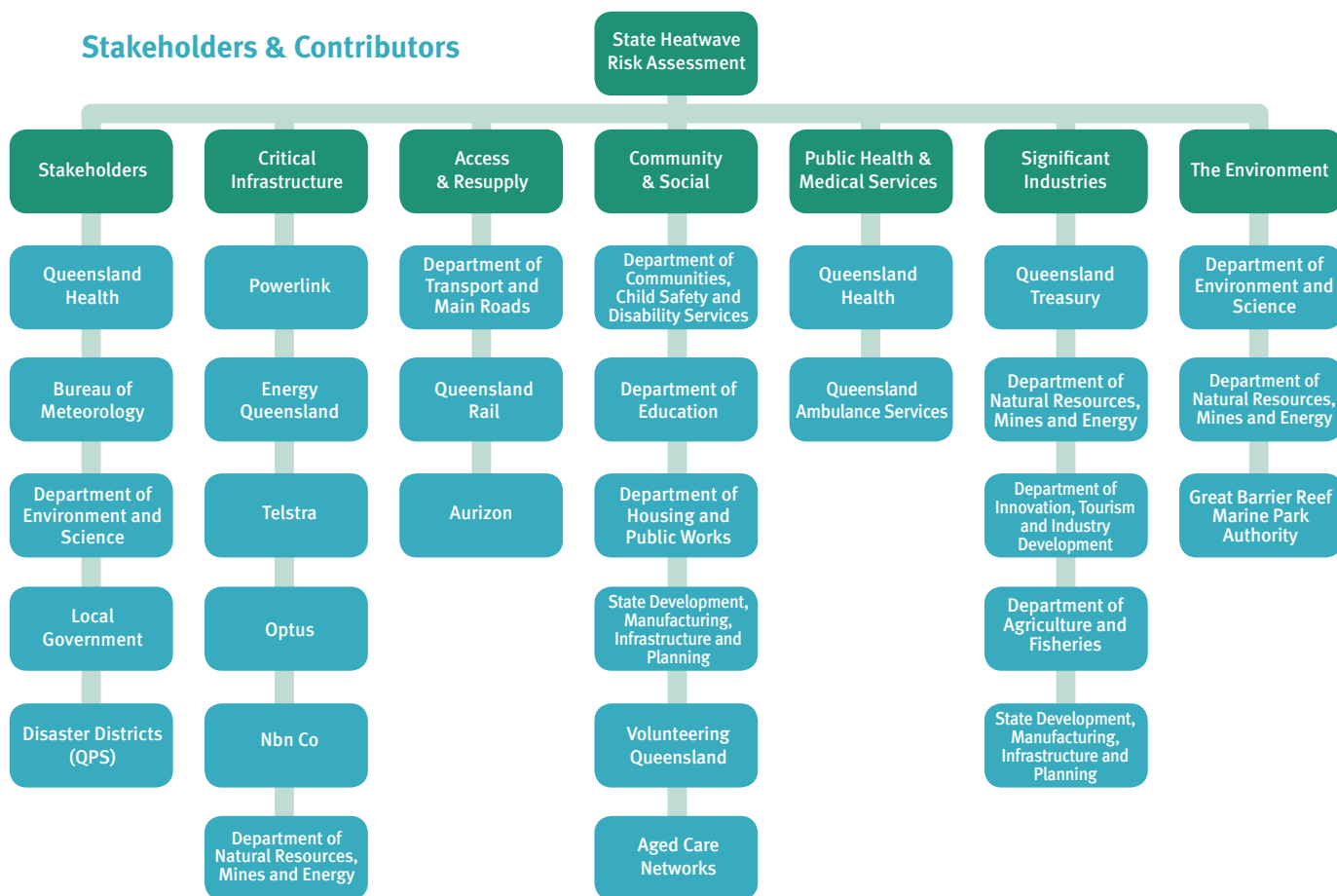


Figure 14: An overview of the stakeholders and contributors being engaged for the project.

Local Disaster Management Groups (LDMG) with Website Links



BOM Heatwave Counts
Severe Heatwaves

| 2008 | 2017 |
|-------------------|------|
| 0 - 1 | |
| 1.000000001 - 9 | |
| 9.000000001 - 18 | |
| 18.00000001 - 27 | |
| 27.00000001 - 36 | |
| 36.00000001 - 45 | |
| 45.00000001 - 54 | |
| 54.00000001 - 63 | |
| 63.00000001 - 72 | |
| 72.00000001 - 81 | |
| 81.00000001 - 90 | |
| 90.00000001 - 255 | |

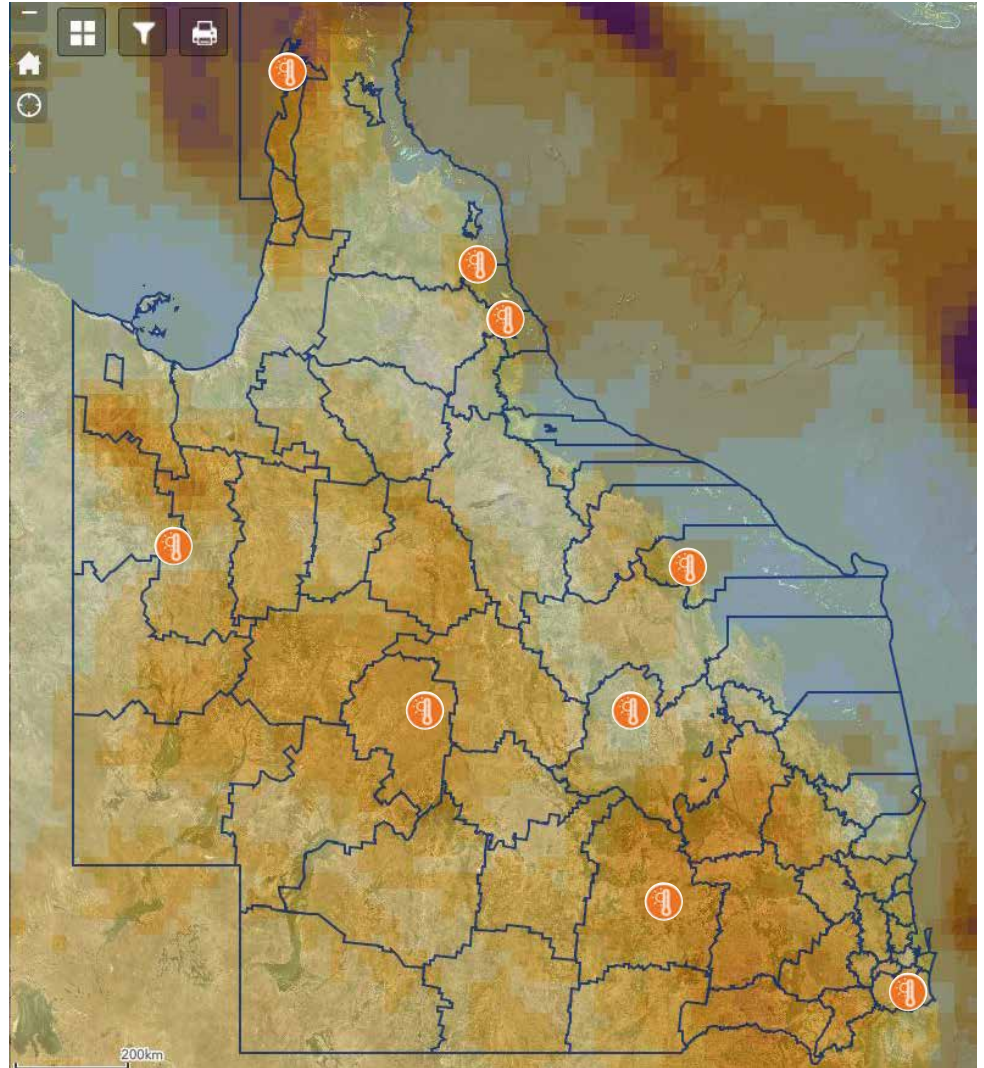


Figure 15: A visualisation of severe heatwaves between 2008–2017, overlaid with the broad locations of the communities to be examined as a part of the risk assessment.

Case study 4: The Queensland Climate Resilient Councils program

The Queensland Climate Resilient Councils program (Q CRC) is a three-year program funded by DES and delivered by the LGAQ. The program is working with 32 Queensland local governments to review and strengthen internal council decision-making processes to respond to climate change. By the end of the program,

participating Queensland councils will have an increased capability to take positive actions to reduce emissions and adapt to climate change.

Phase 2 of the program was a detailed assessment of local government ability to reliably, consistently and efficiently

instigate and implement decisions about responding to climate change. Councils were assessed against the 17 governance indicators (below) on a scale of 0 to 4, where 0 is none (poor practice) and 4 is advanced.



Indicators

| | |
|-----------------------------|---|
| 1. Corporate plan | 10. Climate change policy |
| 2. Financial management | 11. Climate risk assessments |
| 3. Public risk register | 12. Climate legal risk |
| 4. Asset management | 13. Staff capacity and resource allocation |
| 5. Land-use planning | 14. Community/stakeholder engagement |
| 6. Disaster management | 15. Institutional/intergovernmental relationships |
| 7. Greenhouse gas emissions | 16. Climate change information |
| 8. Climate risk management | 17. Information systems |
| 9. Adaptation planning | |

To achieve a score of 4 in the area of 'disaster management':

The Local Disaster Management Plan (LDMP) needs to have a comprehensive inclusion of climate change. Climate change needs to be considered in all elements of the Prevention, Preparedness, Response and Recovery (PPRR). An advanced emergency management plan will identify the changing landscape of risk under a changing climate. It should link to other council activities and policies, in particular land use planning, asset management and community engagement. It should also contain rational cost/benefit and social investment decisions. A supporting climate change policy will greatly assist the implementation of an advanced emergency management plan. However, it should be noted that a basic score does not necessarily mean that the LDMP is compliant with the Queensland Local Disaster Management Guidelines (just has a high consideration of climate change in the hazard description).

To maintain a score of 4, it is recommended that local governments 'monitor any new IPCC reports, government regulations and emerging standards which may affect adaptation actions. Furthermore, ensure that the council maintains sufficient staff capacity and resourcing to maintain this score for this indicator'.

Phase 3 of the Q CRC program commenced in January 2018, and is required to meet objectives B and D of the program:

- B. Queensland local governments have ready access to tested, accurate, appropriately targeted and fit-for-purpose information, templates and documents, that support defensible, timely and effective local climate change decision-making
- D. Development of a local government climate strategy guideline.

For further information about the LGAQ Q CRC program, go to <http://qcr.lgaq.asn.au/>

Distribution of Climate Change Adaptation Governance Scores for Queensland

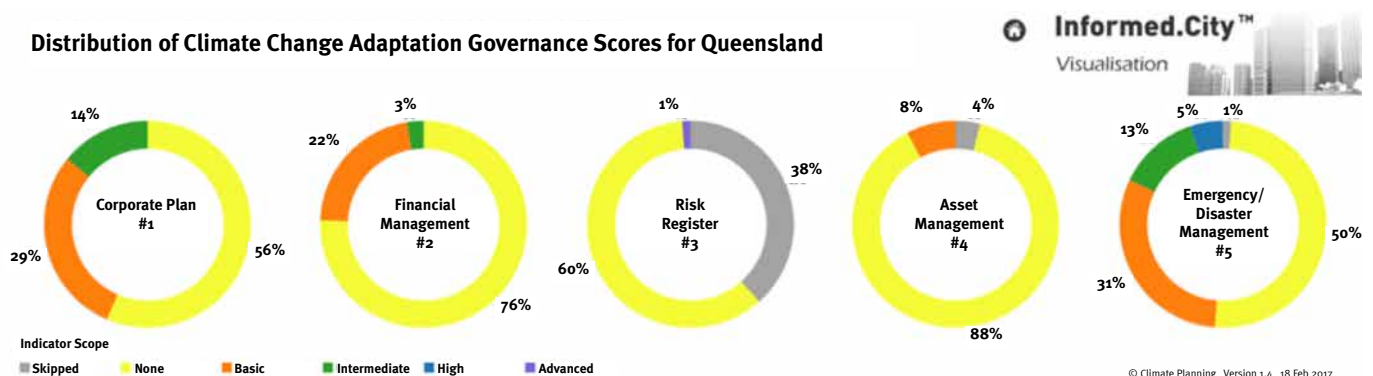


Figure 16: 2015–16 sample distribution of the baseline local government Climate Change Adaptation Governance Scores prior to the Q CRC commencing.

Case study 5: The Livingstone Shire Centre of Excellence for Disaster Management, Innovation and Community Resilience – ‘The Hub’

Livingstone Shire Council has been significantly impacted by several natural disaster events since 2014, costing the community over \$6.1 million. To foster resilience within the community and enhance emergency management capability in the area, the Livingstone Shire Centre of Excellence for Disaster Management, Innovation and Community Resilience was opened on 28 April 2018.

Nicknamed ‘The Hub’, the facility will be a focal point in building regional resilience, and will encourage climate adaptation through community workshops, training and information sessions. The location of ‘The Hub’ is an important part of the community engagement, being nestled in the main street of Yeppoon, fronting

onto a park and giving a great inside and outside venue for education and engagement.

It is a multi-use facility that will also be activated in times of disaster, playing host to the Local Disaster Coordination Centre, and is built to stringent tropical cyclone standards. It has already hosted climate change workshops, school visits, Economic Development Plan launch and business continuity planning discussions, the Local Government Managers Australia Queensland Propeller Program, Local Disaster Management Group meetings, District Disaster Management Group meetings, and Recovery and Resilience Taskforce meetings.

Partnerships are also taking shape with tertiary institutions to take education and resilience-building to the next level, with the proposed embedding of research students, as well as short and diploma level courses to be conducted in the new facility. This proposed structure will ensure research and academia are embedded into the operational functionality of the facility.

The project received \$3.35 million in funding under the Natural Disaster Resilience Program, a joint investment by the State and Federal governments, and \$2.875 million from Livingstone Shire Council.



Figure 17: Livingstone Shire Centre of Excellence for Disaster Management, Innovation and Community Resilience – ‘The Hub’.

